

REMARKS

In accordance with the foregoing, claims 1 and 17 have been amended and claims 5 and 16 have been cancelled. Claims 1-3, 6-8, 14, 15, 17-22, 25 and 29-31 are pending and under consideration. Antecedent support for the claim 1 amendments can be found at page 13, line 15 to page 14, line 25 of the application, as filed.

The Examiner rejects claims 1-3, 5-6, 14-17, and 29-31 under 35 U.S.C. § 103 as being obvious over previously cited Kelsey et al. (US 6,093,789) ("Kelsey") in view of Ciba Irganox 5057 documentation ("Ciba").

The Examiner relies upon Kelsey primarily for Component A. The Examiner modifies Kelsey by incorporating Irganox 5057 of Ciba to disclose the claimed Component B. However, as described below, it would not have been obvious to use the Irganox 5057 of Ciba with the polytrimethylene terephthalate process disclosed in Kelsey.

On page 1 of the Ciba document, the applications for Irganox 5057 are described. The Ciba document states that Irganox 5057 has benefits in the production of polyurethane foam, when used in combination with a hindered phenol. The Ciba document states that when producing polyurethane foams, ordinarily "core discoloration or scorching results from the exothermic reaction of diisocyanate with polyol and diisocyanate with water. Proper stabilization of the polyol protects against oxidation during storage and transport of the polyol, as well as scorch protection during foaming."

Based on the foregoing, Ciba conveys that Irganox 5057 should be added to the polyol before transportation. Otherwise, Irganox 5057 cannot solve the oxidation problems described in Ciba. On the other hand, the Kelsey stabilizers are added as the polymer is being produced (see column 5, line 61 through column 6, line 2), not before transportation. One of ordinary skill in the art would realize that the goals described in Ciba cannot be achieved with the Kelsey process.

Irganox 5057 stabilizes polyols. On the other hand, the starting materials in Kelsey are diols and diacids. Wikipedia describes the oxidation of diols as follows:

Diol oxidation: Alcohols possessing two hydroxy groups located on adjacent carbons — that is, 1,2-diols— suffer oxidative breakage at a carbon-carbon bond with some oxidants such as sodium periodate (NaIO_4) or lead tetraacetate ($\text{Pb}(\text{OAc})_4$), resulting in generation of two carbonyl groups. The reaction is also known as glycol cleavage.

Although Kelsey allows for other diols, such as 1,4-diols and ethylene glycol, Kelsey prefers 1,3-diols, which produce the 1-3 propane diol-based polyesters described throughout the

reference. See column 2, lines 39-53. Unlike 1,2-diols, 1,3-diols do not have significant oxidation problems. Accordingly, even if the Kelsey stabilizers were added before transportation, there is no need to stabilize a polyol, and the diols of Kelsey may not experience the same oxidation.

Ciba also describes that Irganox 5057 may provide scorch protection. As to the scorching problem, the process for forming polyurethane is highly exothermic, releasing significant quantities of heat. Scorching clearly would not be a problem for an endothermic reaction. Kelsey is not related to the production of polyurethane. It is unclear whether the Examiner believes scorching would be a problem with the PTT process described in Kelsey, and if so, why the Examiner has this belief.

The Examiner argues that it would have been obvious to use the Irganox 5057 in Kelsey to provide excellent protection against thermal degradation. See page 3 of the May 27, 2010 Office Action. However, to the extent that thermal degradation is a problem with PTT, it is a problem that Kelsey has already solved. Kelsey describes throughout that by using a hindered phenol and an organophosphate, it is possible to reduce carbonyl by-products and reduce acrolein emissions when the polymer is heated, which cause discoloration over time. Because Kelsey has solved the problem, there is no need to add Irganox 5057.

Although not clear from the Office Action, perhaps the Examiner is arguing that it would have been obvious to substitute the Irganox 5057 for the organophosphate of Kelsey. If the organophosphate of Kelsey were removed, one would expect there could be a discoloration problem in Kelsey. In this case, one might initially believe that Irganox 5057 could solve the problem. However, Kelsey describes Irgafos 168 as a preferred organophosphate. See column 5, lines 31 and 32. Irgafos 168 appears to be the same compound as Irganox 168. The Examiner is requested to compare the structural formula for Irganox 5057 with structural formula II shown at column 4, line 55 of Kelsey. Kelsey's structural formula II differs from Irganox 5057 as follows:

The N at the center of 5057 is replaced with O in structural formula II;

One of the rings in structural formula II is not aromatic because it substitutes P for C; and

Structural formula II has a P bonded to the O in the non-aromatic ring.

Irganox 5057 has two rings joined with a nitrogen atom. Kelsey has two rings joined with an oxygen atom. The teachings of Kelsey imply that oxygen is preferable to nitrogen, at least in the hindered phenol. Specifically, column 3, lines 61-67 of Kelsey state:

Although certain hindered phenols can increase polytrimethylene terephthalate color or reduce polymer molecular weight, the hindered phenols of the preferred group (E=oxygen) cause little or no increase in color. When used in combination with the organophosphates, which tend to decrease polymer color, the effect of the hindered phenol on color is often minimal.

One of ordinary skill in the art would assume that this preference for oxygen over nitrogen also applies to the organophosphate. In this case, Kelsey teaches away from substituting Irganox 5057 for the organophosphate.

Kelsey goes into significant detail regarding the benefits of the organophosphate. For example, Kelsey describes reducing acrolein emissions. These benefit are not described in connection with Irganox 5057 in the Ciba document. Accordingly, one of ordinary skill in the art would believe that if a substitution were made for the organophosphate of Kelsey, the benefits described in Kelsey would be lost. Therefore, the substitution would not have been obvious.

The Examiner's attention is also called to the claim 1 amendments. Claim 1 now replaces the generic description of Component B with a Markush group, which excludes Irganox 5057. Applicants believe there is no reasonable basis to argue that it would have been obvious to use any of the components recited in the Markush grouping, with the Kelsey PTT process.

The Examiner separately rejects claims 7-8, 18-22, and 25 under 35 U.S.C. § 103 as being obvious over Kelsey in view of Ciba and previously cited Kikuchi et al. (US 4,897,438) ("Kikuchi"). Kikuchi is cited only for a thioether compound added in an amount of 0.01 to 5 parts by weight. Kikuchi et al. does not compensate for the deficiencies discussed above with regard to Kelsey and Ciba. Accordingly, claims 7, 8, 18 – 22, and 25 patentably distinguish over the cited references.

There being no further outstanding objections or rejections, it is submitted the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

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If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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